



An Introduction to the
**CHEMICAL CONSERVATION
AND
RESEARCH LABORATORY**
Government Museum, Chennai

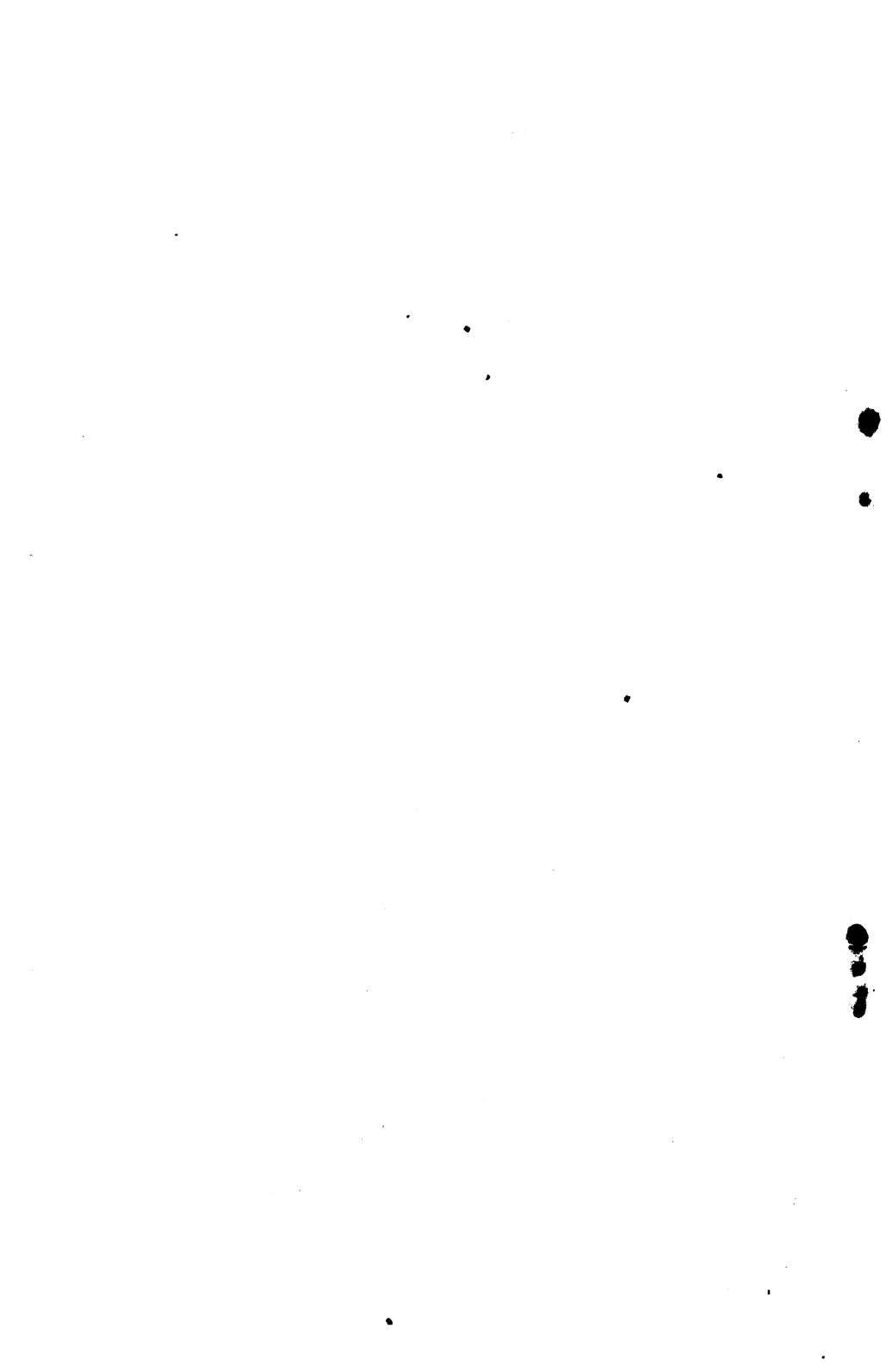
DR. V. JEYARAJ, M.Sc., M.A., Ph.D.,
Curator, Chemical Conservation Section,
Government Museum, Chennai-600 008.

New Series-General Section-Conservation, Vol. 6



Commissioner of Museums

Published by
Thiru K. DHEENADHAYALAN, I.A.S.,
COMMISSIONER OF MUSEUMS,
Government Museum, Egmore, Chennai-600 008.
May, 1997



**An Introduction to the
CHEMICAL CONSERVATION
AND
RESEARCH LABORATORY**

Government Museum, Chennai

Dr. V. Jeyaraj, M.Sc., M.A., Ph.D.,
CURATOR, CHEMICAL CONSERVATION SECTION,
Government Museum, Chennai - 600 008.

New Series, General Section - Conservation, Vol. 6.

©

Commissioner of Museums

Published by

Thiru K. Dheenadhayalan, I.A.S.,
Commissioner of Museums,
Government Museum, Egmore, Chennai - 600 008.
May, 1997.

CONTENTS

	Page No
1. Foreword	1
- K. Dheenadhayalan, I.A.S.	
2. The Chemical Laboratory in the Madras Government Museum	2
- Dr. S. Paramasivan	
3. The Laboratory Since the Museum Centenary	7
- N. Harinarianan	
4. The Laboratory After the Golden Jubilee Celebrations	12
- Dr. V. Jeyaraj	
5. List of Curators of the Laboratory	14
6. Facilities Available in the Laboratory	15
7. Activities of the Laboratory	16
8. Some Highlights of Work in the Laboratory	20
9. Publications from the Laboratory	24
10. The Course on "Care of Museum Objects"	32
11. Application for the Course on "Care of Museum Objects"	35

K. Dheenadhayalan, I.A.S.,
Commissioner of Museums.

Government Museum,
Egmore, Chennai - 600 008.

Foreword

"Conservation" is a word which is frequently used by every one. In the museum it means conserving our cultural and artistic heritage for posterity. The need for the Chemical Conservation laboratory was felt and a laboratory was established in this museum in 1930. Dr. S. Paramasivan's contribution to this laboratory was by way of research work is commendable. His hard labour resulted in many publications both in the journals at home and abroad. The New Chemistry Block came into existence during Thiru N. Harinarayana, the then Curator of this section. It was he who was responsible for starting the refresher course on "Care of Museum Objects" in 1974. Thiruvalargal R. Subramanian, B. Ramachandran and S. Thangavelu, the subsequent Curators made strides in the development of this laboratory.

This Laboratory has done enormous work in the conservation of antiquities. It also trains up people in preserving our past. Awareness is an important factor and so this laboratory conducts various training programmes for museologists, archivists, temple executive officers, students, etc.

It has also introduced the scheme of extending conservation services to the needy individuals and institutions in preserving the art objects.

This Laboratory has conducted successfully many research projects and the outcome has been brought out as reports. It has got tie up with Indian Institute of Technology, Chennai, Indra Gandhi Centre for Atomic Research, Kalpakkam and Anna University, Chennai on many research projects. Soon, thanks to the pristine glory of its services, Chennai Museum is going to be a privileged institution to be recognised by the Chennai University as a "Research Institution". I am happy to note that, at a very appropriate time, this booklet by Dr. V. Jeyaraj is released to benefit all in need.

Chennai - 8,

30.5.1997

(K. Dheenadhayalan)

The Chemical Laboratory in the Madras Government Museum *

Dr. S. PARAMASIVAN M.A., D.Sc.,
First Curator,
Chemical Conservation Laboratory

Dr. F.H. GRAVELY, who was Superintendent of the Madras Government Museum from 1920 to 1940, was responsible to a great extent for building up the research activities of the great institution, and giving it a place among the great Museums of the world. The Chemical Laboratory in the Museum owes its inception to his scientific vision and forethought.

It is well within the knowledge of scholars that the Madras Government Museum has the richest collection of world famous South Indian bronzes of great value. These bronze collections have already impressed distinguished scholars from all parts of the world.

Bronzes are always subject to a process of corrosion. The process is intensified by the saline atmosphere caused by the nearness of the sea, as at Madras. Most of the bronzes in the Madras Museum are treasure-trove finds. They had been lying buried under the earth for centuries. Though contamination with soil and mineralized waters they become seriously corroded. A thick crust of basic carbonate and basic chloride was formed on the surface hiding all the decorative details and inscriptions. At times, there were also bluish green specks, which attacked the bronze and enlarged and caused corrosion in an epidemic form. These processes have been going on continuously for years. The bronzes have been removed in this condition to the Museum. It is, therefore, necessary to eliminate the corrosive crusts, so as to expose the details underneath. Occasionally, however, one comes across a crust, which is uniform in character, and of pleasing enamel-like appearance. This crust, which is called, "patina" is quite compact and protects the bronze from further disintegration and the details are still visible through it.

* Reproduced from the centenary Souvenir, 1951, Government Museum, Madras

With the valuable collection, as at the Madras Government Museum, it was felt necessary to treat the bronzes disfigured by corrosive crusts in order to expose the decorative details and to eliminate the bronze disease, which brings in added deterioration. As early as 1923, these facts were realized by the then Superintendent of the Museum, Dr. F.H. Gravely, who for the first time, moved the Madras Government for the appointment of an Archaeological Chemist to undertake this task. As an experimental measure, Mr. Ram Singh Ahuja, who had been a Government of India scholar working under the Archaeological Chemist in India, Dehra Dun, was appointed to the post, for six months. At the end of this period, the results of his experiments were communicated to the Government of Madras who referred them to Prof. Erlam Smith, then Professor of Chemistry in the Presidency College, Madras.

It is well known that corrosion is an electro-chemical process, and a reversal of this process will restore the corroded object back to its original state. This principle had been suggested by Prof. Colin G. Fink, an eminent electrochemist for the restoration of bronzes in the Metropolitan Museum of Art New York. The method has been applied with considerable success in important American Museums such as the Metropolitan Museum, Field Museum of Natural History, Chicago, and by some of the American Excavation units working in Greece. Prof. Smith felt that the same methods must be employed with modification for the restoration of bronzes in the Madras Government Museum.

The suggestion was accepted by the Madras Government and an Archaeological Chemist was specially appointed and exclusively set on this task, under the guidance of Prof. Smith. The present writer was appointed to the post in 1930. The work of electrolytic restoration has been going on since then.

With regard to the electrolytic treatment, the American Museum had to deal with bronzes of about 12 to 18 inches, while the bronzes in the Madras Government Museum are about 4.5 feet in height. The former is analogous to a laboratory scale of work and the latter to the industrial scale. Which demands a technique of its own. The difference may be realized better from the fact that the maximum power output in American Museums is about 100 watts, while in Madras it is about 7,000 watts.

The machinery for the electrolytic reduction was specially designed by the Metropolitan Vickers and consisted of a 12 h.p. motor generator set capable of giving an output 7 K.W. There are three parallel circuits, with ranges 0-6C, 0-20 and 0-5 amps, so that three lots of bronzes can be treated simultaneously. The output can be adjusted to get any desired voltage. In this process, a cast iron vat, insulated from the ground, acts as the electrolytic cell as well as the anode and the bronze insulated from the cell, acts as the cathode. A two per cent aqueous solution of caustic soda serves as electrolyte.

The excellence of the method can be gauged from the following facts. Bronzes which had been covered over with such a heavy crust that they appeared shapeless and unrecognizable, were restored to their original form, and many interesting details have been laid bare after removal of the crust. This also ensures the long life of the bronze. These facts will become clear from the Museum albums of photographs of bronzes before and after cleaning. In 1932, Sir Richard Gregory, F.R.S., Editor of Nature visited the laboratory and was greatly impressed with the work. In a press interview which he gave on 'Scientific work in India,' he made a special mention of the electrolytic process employed in the Madras Museum.

The electrolytic process has been extended to coins and iron antiquities.

In 1935, the Museum Commission headed by Mr. S.F. Markham and Mr. H. Hargreaves, visited the Madras Government Museum. They were greatly interested in the work done in the chemical laboratory and suggested that all the exhibits in the Museum, and not merely the bronzes, must be included with the chemist's purview. Thus the activities of the archaeological chemist were widened. The laboratory was at first located in a temporary three-roomed structure, which had been intended for a restaurant. With increased activity, additional laboratory accommodation was found necessary. In 1937, a separate laboratory was built, being the only one of its kind in India. Simultaneously, all the exhibits in the Museum in the archaeological, anthropological, and pre-historic sections came up for treatment. Such widely differing materials as gold, silver, bronze, lead, iron, stone, including lime-stone and marble, textiles, leather and the like came up to the chemical laboratory for chemical treatment and preservation.

The Madras Museum is one of the few institutions in India where the quarterly examination of the exhibits, is being conducted by the chemist and the curators of the sections concerned. This acts as a check on the deterioration of the exhibits.

The Madras Museum was also of help to the Archaeological Survey of India. In 1935, Mr. J.F. Blakiston who was then Director-General of Archaeology in India, requested Dr. Gravely to spare the services of the Museum Chemist to examine and report on the condition of the Ajanta-like paintings in the Brihadisvara temple at Tanjore, and to preserve the paintings at Sittannavasal in the Pudukkottai State. Dr. Gravely was quick to realize the paucity of experts in this country to deal with problems of preservation of our rich cultural heritages in the form of ancient paintings. He was also impressed with the urgency in matter of treatment of paintings. Though the subject did not come within the purview of the Museum, he realized the peculiar circumstances and co-operated fully with the efforts of Mr. J.F. Blakiston.

This was the starting point for a general scientific survey of wall painting, which were disintegrating in many parts of India. This laboratory was the first to conduct a scientific survey and publish the results in leading scientific journals such as Nature, Technical Studies, Proceedings of the Indian Academy of Sciences, Journal of the University of Madras, Current Science, Journal of the Indian Society of Oriental Art, etc. In 1943, and at the request of the Archaeological Survey of India, another fresh survey of the condition of some of the important wall paintings was made by the Museum Chemist under orders of the Government of Madras.

It may be of interest to know that the preliminary work done in the Madras Museum as early as 1935, was the basis for the systematic treatment of Tanjore paintings, which was undertaken by the Department of Archaeology in 1946.

Paintings were not the only subjects which were tackled here. There are many metallic antiquities, whose exact methods of fabrication have to be worked out experimentally to reconstruct the technical skill and technical achievements of the ancients in the field of metallurgy. A beginning was made

in this direction in the Madras Government Museum, supplemented by the facilities available at the Chemical and Metallurgical Laboratories of the M. & S.M. Railway, Madras.

The Laboratory has given training in methods of preservation to Museum workers from Pudukkottai, Hyderabad, Nagpur, Baroda, etc.

THE LABORATORY SINCE THE MUSEUM CENTENARY *

N. HARINARAYANA, M.A., B.Sc., (Tech.)

Retd. Director of Museums.

In the preceding article published in this brochure, Dr. Paramasivan, who was responsible for setting up this laboratory, has recounted the story of its beginnings and its work upto the time of the Centenary of the Museum in 1951. He left it in 1946 to join the Archaeological Survey of India. He was succeeded by Mr. Nageswara Sastri and then Mr. B. Narayana Shenoy who were here only for short periods of time. The next Curator of the Chem. Cons. Section, who left his mark on the Lab. was Mr. R. Subramanian who joined it in 1949. His was a time of further consolidation of the Lab. as a centre of conservation activity. During his tenure as Curator, he went in 1954-55 to the U.S. for training in methods of chemical conservation, especially electrolytic treatment of bronzes. Mr. Subramanian carried out research in the composition of glass beads from Arikamedu and published the results in "Current Science". Mr. Subramanian was away from the Laboratory for short spells of time on three occasions during which Mr. K. Subramanian, Dr. T.V. Satyamurti and Mr. Harinarayana acted in his place. Mr. Subramanian also realized the need for expanding the Laboratory's facilities and prepared plans for a new two-storeyed building for including further sections on analytical chemistry and physical examinations of objects.

When Mr. Subramanian left in 1956 for setting up a Science Museum in the National Physical Lab., Thiru B. Ramachandran, a chemical engineer, took over charge of the Laboratory. It was the first time that a chemical engineer was appointed as Curator of this Section. Thiru Ramachandran interested himself in the weights of coins as an index to their circulation as well as periods of their currency, and published a paper on his findings.

In May 1957, Mr. N. Harinarayana became the Curator for Chemical Conservation and in the same year, the plans for expansion of the Laboratory sent earlier in Mr. R. Subramanian's time were sanctioned, and the construction

* Reproduced from the brochure Chemical Conservation and Research Laboratory of the Government Museum, Madras, Golden Jubilee, 1930-1982

work on the new building was commenced. At the same time, requirements of furniture and equipment for the new block were also prepared and got sanctioned. The work of setting up of the Lab was going on apace when Mr. Harinarayana went to France on a French Govt. Fellowship for training in restoration of paintings at the Laboratory of the Louvre Museum and also to London for training in the Lab of the Institute of Archaeology. During his absence abroad, Mr. Gopalakrishnan, another chemical engineer, was incharge of the Laboratory.

The new building of the Lab was made ready in all respects and opened formally in September 1963 by His Excellency Shri Bishnuram Medhi, who was the Governor of Madras. A number of new equipment had been purchased meanwhile and set up, such as a Carl Zeiss spectro photometre, a Phillips X-ray unit, a vacuum fumigation chamber, a Selenium Rectifier for the electrolytic equipment, a fumigation chamber for archival materials. The selenium rectifier was specially designed for taking over supply of a steady direct current to the electrolytic cells. This expansion of the Laboratory was an important event since such a well-equipped lab. for conservation work in a museum was unique at that time in our country. With the increased space available, the set-up of the Laboratory was altered fully. The old building was set apart for electrolytic restoration and for a dark room for developing X-ray films. The main hall on the ground floor of the new building was made the Analytical Section. One room was set apart for the Curator's office and another, for a small lecture room. At various stages in the expansion of the laboratory from the construction of the building to the installation of furniture and equipment, Dr. Paramasivan gave valuable advice.

It was at about this time in 1962-63, that three reports about "Museum objects in Hot and Humid Climates", "Conservation of stone" and "Electrolytic Treatment of Metals" were prepared for the ICOM Committees and sent in the consolidated reports issued by the ICOM Committees later, these reports were incorporated. Mr. H.J. Plenderleith, the Director of the Rome Centre visited the Laboratory on 31st Jan. 1964. In Feb. 1965, Thiru N. Harinarayana left the Lab to be the Asst. Chemist incharge of the Conservation of Laboratory of the Salar Jung Museum. At this another chemical engineer, Mr. S. Thangavelu was made Curator, Chemical Conservation and continued

till 1972. During this time Mr. Thangavelu took interest in the atmospheric factors affecting museum objects. He also contributed a paper on the set-up of the Laboratory to "Studies in Conservation" published by the International Institute of Conservation, London.

Mr. Haninarayana came back to be in charge of the Lab. in 1972. At this time the Lab. took on a number of conservation projects out side the Museum and he continued till 1977 Dec. When he was made Asst. Director of Museum Mr. Thangavelu took over at this time and left in Feb. 1978 and Mr. Jeyaraj was appointed as Curator from April 1978 and has continued as Curator to the present.

During the seventies, the Chemical Conservation laboratory of this Museum came to be associated more and more with the task of helping in the conservation of important art treasures outside its collections while continuing to look after its regular work of conservation of the objects in the Museum. The earliest of such tasks was the treatment of 14th Century Hoysala paintings in the Venugopala Shrine of the Srirangam Temple. This was carried out in 1972 and the then Curator not only treated these paintings but also studied the paintings in other parts of the same temple and prepared a detailed report on the action to be taken to preserve them. Other tasks undertaken ranged from the study of salt-encrusted pillars in the temple at Thiruvallur near Madras to the damaged temple car at Nedungudi in Pudukottai District, from the badly affected paintings on the walls around the Golden Lily Tank in the Madurai Temple to the stained marbles in the St. George's Cathedral and the discoloured prints in the Raj Bhavan. The most interesting study was that of salt-encrusted granite pillars in the Thiruvallur temple. The effect of the salt was such that the granite surface has been greatly weakened and is found to crumble at the touch. The report on the possible method of conservation of this was also given and if implemented, it would be an important achievement in conservation. The study of the use of X-ray fluorescence for the analysis of bronzes and copper coins was made with the help of the Bhabha Atomic Research Centre at Bombay so as to assess the possibilities of correlating metal composition of objects with their date and provenance. Further studies on the same lines were carried out in

collaboration with the Forensic Laboratory in madras and the Electronic Corporation of India Limited who brought their portable XRF equipment for this purpose.

On the conservation side, the restoration of 12 oil paintings of the British Governors of Madras previously kept in the Rajaji Hall, was an important piece of work. Sixty-eight, 19th Century British prints in the Madras Raj Bhavan were treated for discolouration and fragility of paper and reframed to improve their appearance. Marbles in the St. George's Cathedral and the St. Andrews, church both at Madras were found to be stained due to dust and insect droppings and algae. The stains were removed to make the statues look much better. Recently the present Curator, Thiru V. Jeyaraj helped in censerving the famous bronze statue of Duplex in Pondicherry.

The Conservation Laboratory has not only interested itself in helping preserve objects and examining art materials but also in disseminating knowledge about conservation especially among personnel from other museums and allied institutions. This has been done primarily through an annual Refresher Course entitled "Care of Museum Objects". The first of these courses was organised in 1974, and these have been held yearly ever since and have attracted curators, chemists etc. from museums, universities and other institutions in different parts of the country. Regularly the Curator of the Laboratory gives popular lectures on selected topics in conservation. Moreover special exhibitions or special exhibits depicting aspects of conservation of different types of materials are arranged in the museum or in the museum pavilion in the annual trade fairs, thereby trying to put across to the lay public a basic idea of conservation.

Further expansion of the scope of work in the Lab. is also being contemplated. The first step in this direction has been to increase the staff in the section, for which proposals have already been sent to Govt. One additional Tech. Asst. has been appointed. This would be sought to be carried further so that more and more conservation work could be undertaken by this Lab. One scheme which is contemplated would be to undertake a thorough study of the composition of bronzes through non-destructive analytical methods like X-ray fluorescence and correlate it with the date and provenance of

bronzes and establish the possibility of "finger-printing" these valuable objects of art.

From its beginnings, the Lab. has been, in its own way, taking the lead in conservation studies. The electrolytic method itself was adapted, in terms of equipment and technique from small bronzes for which it had been initially developed to the large bronzes in this collection. Studies of techniques of wall paintings were undertaken in this Lab. much earlier than elsewhere, and it was made systematic and sound. It is this tradition which is being continued even now, and on the occasion of the Golden Jubilee of the Laboratory, it is visualised that this would be continued so that technical studies of art objects and their conservation would be maintained at a high level.

The Laboratory After the Golden Jubilee Celebrations

Dr. V. Jeyaraj
Curator, Chemical Conservation Section,
Government Museum, Chennai - 8.

The Chemical Conservation and Research Laboratory of the Museum made its strides at various facets as Thiru. N. Harinarayana, a Conservation Chemist was appointed as the Director of Museums. Many requests were received from Tirupati - Tirumalai Devasthanam to train the staff of the TTD museum on conservation lines. The requests for conserving tablets, sculptures, etc., were also at the increase. It was felt that non-destructive analysis was the best method for analysing the valuable bronzes and so a micro-analytical corner was set up. The spectrophotometer was regularly used for analysis.

It was in 1986, that Thiru. V. Jeyaraj was transferred to Erode to set up a district Museum there and Thiru S. Thangavelu took over as Curator. He arranged many workshops on conservation and many records, paintings, palmleaf manuscripts, etc., from private and government agencies were conserved. It was a tough time that during the South Indian Chola Bronze Exhibition, in 1992, 500 bronze icons were treated for the exhibition.

In 1993, Dr. V. Jeyaraj was transferred back to Chennai Museum as Thiru S. Thangavelu was promoted as Assistant Director. In 1994, Dr. V. Jeyaraj was awarded a U.K. Visiting Fellowship by the Nehru Trust. He was deputed to UK for 3 months to study "The Current Policies and Practices in the UK Museums". He was trained in the British Museum and Victoria Albert Museum on conservation policies and practices. He visited the laboratories in Paris museums especially in the Louvre Museum. His training in Berlin Conservation laboratories was much useful to propose many research projects in the Chennai Museum.

Research projects with the financial assistance from Nehru Trust, New Delhi and South Zone Cultural Centre were successfully carried out.

Paintings at Chitra Sabha, Courtalum, Paintings at the Andal Temple at Srivilliputhur, The Army Museum at Wellington, Saraswathi Mahal Library Museum, Tanjore, etc., were inspected and conservation reports were prepared on them.

Creating an awareness on the conservation of our cultural and artistic heritage is taking priority now. A conservation awareness is being created among museum professionals, archivists, temple executive officers, students and public.

The Chemical Conservation and Research Laboratory of the museum is enjoying a name in conservation activities, research activities and training programmes. In the financial year 1997-98, the Government of Tamilnadu has sanctioned an amount of Rs. 1 lakh to establish a Conservation Gallery in the Museum. This laboratory is also engaged in treating bronzes and sculptures using laser beam and holographing bronzes in collaboration with the Anna University. It is soon to be recognised by the University of Chennai as a centre for conducting research leading to Ph.D. Degree. It is marching towards a bright future and it will be converted into a Centre of Advanced Studies in Conservation, which then will have wealth of activities to preserve our rich heritage for posterity.

LIST OF CURATORS OF THE LABORATORY

1.	Dr. S. Paramasivan	Apr	1930		1946
2.	Nageshwara Sastri				
3.	B. Narayana Shenoy				
4.	R. Subramanian	Jan	1949	Dec	1950
5.	Ka. Subramanian	Dec	1950	Apr	1951
6.	T.V. Satyamurti	Apr	1951	Apr	1952
7.	R. Subramanian	Apr	1952	Apr	1954
8.	N. Harinarayana	Aug	1954	Aug	1955
9.	R. Subramanian	Sept	1955	May	1956
10.	B. Ramachandran	May	1956	May	1958
11.	N. Harinarayana	May	1958	Aug	1961
12.	V. Gopalakrishnan	Aug	1961	July	1962
13.	N. Harinarayana	Aug	1962	Feb	1965
14.	M. Kalyani	Feb	1965	Apr	1965
15.	S. Thangavelu	May	1965	June	1972
16.	N. Harinarayana	June	1972	Nov	1977
17.	S. Thangavelu	Nov	1977	Feb	1978
18.	V. Jeyaraj	Apr	1978	June	1986
19.	S. Thangavelu	July	1986	June	1993
20.	Dr. V. Jeyaraj	June	1993		

PRESENT STAFF OF THE LABORATORY

Curator	:	Dr. V. Jeyaraj
Laboratory Assistant	:	J.D. Jagannathan
Technical Assistant	:	B. Saravanan
Interns	:	Dally Chummar
	:	Y.A. Divya Durga Prasad

FACILITIES AVAILABLE IN THE LABORATORY

Staff:

The Chemical Conservation Laboratory of the Government Museum, Chennai is headed by a Curator. He is helped by a Laboratory Assistant and Technical Assistant in the regular activities of the Laboratory. Because of the quality of workmanship and expertise two persons have joined in the laboratory as interns one in conservation of Textiles and the other on conservation of paintings in 1996. It is expected to have more staff in the years to come through projects and through regular appointments.

Conservation Facilities

This laboratory is located in the huge museum campus at an area of over 4000 square feet. It has got all the facilities for carrying out conservation of bronze icons, coins, weapons, paintings, stone objects, paper, anthropological objects. It has got research room, students room, dark room, lecture room, analytical section, restoration section, etc. Microscopes, X-ray equipment, spectrophotometer, etc. are some of the sophisticated instruments of the laboratory.

Library Facilities

This laboratory is blessed with a library having about 3000 books including journals. The Connemara Public Library is also located within the museum campus.

ACTIVITIES OF THE LABORATORY

The activities of the laboratory of this museum is multifarious and so it is always busy with different types of works related to the preservation of antiquities. We may say that this laboratory is vibrant. From its inception it is preserving its own collection and also collections of the museums under its control. Its expertise is vast and it has shared its expertise with similar institutions in this country. Its helping hand is so great that it helps other institutions in preservation and offering technical opinions. Research facilities are available. Therefore conservation research is carried out besides conducting many research programmes on various aspects of technology and fabrication, etc. The outcome of the various research activities are published in the journals both at home and abroad. The publications of this laboratory are also in the form of bulletins and books. Besides this, training programmes are also conducted in this museum for those who are interested in acquiring practical knowledge in conservation.

Internal Conservation

Preservation is the foremost function of the museum. Preservation includes conservation and restoration. Thousands of objects are preserved in this museum. These objects are affected by atmospheric factors, biological factors, internal factors, mishandling, and so on and so forth. The objects are well examined before any conservation or restoration treatment is to be given to the objects. After the proper examination of the objects and studying the environmental conditions of the objects the treatment to be resorted to are to be examined. Methods of treatment varies from object to object as they differ in the material fabrication, etc. Physical methods are resorted to in the beginning. When it is found to be difficult, chemical methods, electrochemical methods, electrolytic methods are used. What ever may be the method of treatment, the treated objects should be coated with a preservative coating.

Conservation Extension Service

There are very few museums which have conservation laboratories. Even though they have the facilities for conservation they are not extending the

conservation services to others. In the beginning there were many requests from institutions which were in need of this facility. Recently this laboratory has introduced the facility of extending the conservation facilities to private institutions, individuals and other museums. A nominal charge is being levied towards conservation services extended and the materials necessary for restoration are to be supplied by the individual or the institution which is in need of this service. There is a long queue for availing this facility.

Training Facilities:

As there were many requests from institutions for training for their staff in conservation, this laboratory extended training facilities to those staff who sought the training. Since the demand was high, the then Curator of the Laboratory, Thiru. N. Harinarayana, thought that a training programme might be conducted for a month so that all those who were interested could join in the course. It was in 1974, the first course was started and only 8 persons were allowed to participate. Year by year it was well received by the museums and so museum staff from all over the country participated in this programme. This course was meant for those who work in the museums, archaeology departments, Hindu Religious and Charitable Endowments Department, etc. So far 22 refresher courses have been conducted. From 1996 onwards the strength of the participants has been increased from 8 to 10.

In 1995, a course for the Executive Officers of the Hindu Religious and Charitable Endowments Board of Tamil Nadu was started for the first time in the history of India. This gave an awareness to them who are in-charge of the antiquities in the temples and preserving them for posterity. Soon after the course was over there are many requests from the temples to advise them in preserving the antiquities under their control.

In January, 1997, a training programme was conducted for the staff who are working in the archives enabling them to understand the chemical and physical principles involved in the preservation of archival materials.

Besides these, training programmes are conducted to the students of colleges in conservation. For example, Stella Maris College students were taken to a temple site to take up cleaning work after a simple training on conservation.

Under the U.G.C. Programme students of B.A. History (Vocational) from the Madras Christian College were given training in conservation of museum objects in the laboratory. They are also given "On the job training" in conservation.

Training programmes are conducted in the districts also for the students from colleges and schools for two or three days. The students were used in cleaning the Padaleeswarar temple at Cuddalore after imparting training to them. In this work 250 students were utilised on 5 days.

Recently, internship training is also included in this museum with an idea of training individuals so that they can help in preserving our heritage. It is encouraging that at present two interns are being trained in this laboratory, one is on "Conservation of Paintings" and the other is on "Conservation of Textiles". This training is for one year duration.

Research

This laboratory is very famous for the research in the field of ancient technology, painting techniques, conservation methods, etc. The materials are varied and the problems of conservation are also varied and a so new methods of conservation are highly essential. It was conducting independent research project on these lines and now with the help of organisations like Indra Gandhi Centre for Atomic Research, Kalpakkam, Anna University, Chennai, I.I.T. Chennai, and foreign agencies like Getty Conservation Institute, U.S.A. many projects are under progress. They are,

1. Finger-printing of South Indian Pachaloha Idols, in collaboration with the Indra Gandhi Centre for Atomic Research, Kalpakkam under the auspices of the Department of Science and Technology, New Delhi.
2. Laser Cleaning of Bronze-icons, in collaboration with the Centre for Laser Technology, Ann University, Chennai.
3. Holographing of Bronze Icons, in collaboration with the Centre for Laser Technology, Anna University, Chennai.
4. Survey of Museums in Tamil Nadu on the Conservation point of view

5. Survey of Bronzes in Tamil Nadu and Their Conservation and Characterisation, in collaboration with the Indra Gandhi Centre for Atomic Research, Kalpakkam

In 1996, a research project on "A Technical Study on the Coins of Arcot Nawabs" under the auspices of the Nehru Trust, New Delhi and other project on "Restoration of Paintings" under the auspices of the South Zone Cultural Centre, Tanjore were carried out and completed successfully followed with their project reports.

The Madras University recently sent a three member commission to examine the museum to recognise it as a centre of research leading to Ph.D. Degree. In the near future this laboratory will be recognised to conduct research leading to Ph.D. Degree. Many researchers will be enrolled here in this laboratory and this laboratory will be a centre of producing young conservation scientists to this country.

Workshops, Conferences, Camps, etc.

The staff of this laboratory are actively participating in various seminars, conferences, workshops, camps conducted by other institutions in India and abroad. Besides attending them, this laboratory itself has conducted a national conference on "Conservation of Textiles" in collaboration with the Indian Association for the Study of Conservation of Cultural Property, New Delhi. A few workshops on "Conservation of Metals", "Conservation of Paintings", etc., were conducted in collaboration with other organisations. N.S.S. Special Camp for the college students of the city colleges on "Preservation of Our Cultural Heritage" was conducted for 10 days in this Museum. It is now working on arranging a National Seminar on "Conservation of Museum Objects" in collaboration with the Indra Gandhi Centre for Atomic Research, Kalpakkam.

SOME HIGHLIGHTS OF WORK IN THE LABORATORY

- 1930 - Appointment of the first Curator to the Laboratory.
- 1931 - Installation of motor generator for electrolytic restoration.
- 1934 - Preservation and x-ray studies of Nagapattinam bronzes
- 1935 - Preliminary report on the mural paintings in the Brahadeswara Temple at Tanjore (June to July 1935).
- 1937-38 - Study and preservation of wall paintings at Sittannavasal
- 1938-39 - Studies of the techniques of wall paintings in fifteen well known sites.
- 1939-40 - Systematic study of the metallography of bronze objects and prehistoric implements
- 1944-45 - Examination of Maratha paintings in the Tanjore Palace and the Chola paintings in Brahadeswara temple at Tanjore.
- 1952-53 - Experiments in museum climate in the National Art Gallery and the main Museum building; experiments in the use of latex for taking moulds of image and coins
- 1953-54 - Experiments in the use of Asiatic seaweed for preparing moulds.
- 1954-55 - Research in the treatment of metal objects in the John Hookins University (by R. Subramanian)
- 1959 - Special exhibition on "Glass".
- 1961-62 - Special exhibition on "Electrolytic treatment of bronze images".
- 1962-63 - Preparation of three reports on "Museum objects in humid and hot climates", "Electrolytic restoration of metals" and "Study of stones" for ICOM Committees
- 1963 - Report on the preservation of bronzes in the Tanjore Art Gallery
- 1972 - Preservation of paintings in the Venugopala Shrine in the temple at Srirangam.

- 1973 - Preservation of marbles in the St. George's Cathedral, Madras.
- 1973 - Preservation of oil paintings in the Rajaji Hall, Madras.
- 1973 - Examination of ancient pottery specimens for the University of Madras, Department of Archaeology.
- 1973 - Preparation of report on conservation of Museum objects in the Pudukkottai Museum.
- 1974 - Report on preservation of newspapers in the Swadesamitran office.
- 1974 - Special exhibition on "Conservation of iron objects".
- 1974 - Examination of paintings around the Golden Lily Tank in the Meenakshi-Sundareswarar Temple in madurai.
Starting the Course "Care of Museum Objects".
- 1975 - Preservation of Tallapakkam Annamacharya copper plates of the Tirupati-Tirumalai Devasthanam at Tirupati.
- 1975 - Examination of a temple car at Nedungudi near Pudukkottai and report on its conservation.
- 1975 - Examination of paintings in Sri Varadarajaswamy temple in Kancheepuram and report on their conservation.
- 1975 - Examination of salt - encrusted pillars in the temple at Thiruvallur and report of suggested treatment sent to the Temple authorities.
- 1976 - Experiments on analysis of three small metal objects through the use of isotope-excited X-ray fluorescence in the Bhabha Atomic Research Centre, Bombay.
- 1976 - Preservation of British Prints of the Raj Bhavan, Madras.
- 1977-78 - Preservation of marble statues and tablets in the St. Andrew's Church, Egmore.
- 1979 - Preservation of oil paintings in the Madras Medical College.
- 1982 - Treatment of Duplex statue - Pondicherry.

- 1982 - A Laboratory Assistant post was created. Golden Jubilee Celebrations of the Laboratory was celebrated.
"Conservation of Textiles" - Seminar conducted.
- 1983 - Restoration of Marble sculptures and tablets at St. George's Cathedral, Chennai.
Curator V. Jeyaraj, registered for his Ph.D. Degree.
- 1984 - Treating a large Vishnu stone statue at CIPET, Chennai.
- 1985 - Setting up of micro-analytical corner in the Laboratory
- 1986 - Conducting Conservation Course for Madurai University M.A. (History of Art) students.
- 1987 - Treatment to the Tanjore Art Gallery Bronzes.
- 1988 - Workshop on "Conservation of Textiles"
Treatment of old records at Simpson Company, Chennai.
- 1989 - Treatment of paper prints and oil paintings at Raj Bhavan, Chennai.
- 1990 - Ph.D. Degree was awarded to Curator V. Jeyaraj for the thesis on "Correlation between Composition, Corrosion Products & Metallographic Structure of Metallic Antiquities" by the University of Madras.
Treatment of palm-leaf manuscripts at Vidhya Peedam, Sholinghur.
- 1991 - Workshop on "Conservation of Paintings" in collaboration with National Research Laboratory for Conservation, Lucknow.
- 1992 - Treatment of 500 Chola bronze for the Exhibition "South Indian Bronzes".
- 1994 - N.S.S. Special Camp - Preservation of our heritage. Award of U.K. Visiting Fellowship to Dr. V. Jeyaraj by the Nehru Trust.
Visited the laboratories at Paris and Berlin.
- 1995 - Course on "Care of Temple Antiquities" for Temple Executive Officers.

1996 - A Technical Study on the Coins of Arcot Nawabs - Research product under the auspices of Nehru Trust

"Restoration of Paintings" - Restoration product under the auspices of South Zone Cultural Centre Thanjavur

Finger - printing of South Indian Panchaloha Idols - Research Project.

Internship training started for two persons

Receipt of Dr. S. Paramasivan's personal collection of books to the laboratory as a gift.

1997 - Training on "Care of Archival Materials" started for the staff of the Tamilnadu Archives (Jan. 97)

University Commission inspected the laboratory to recognise it to as a Research Institution to conduct research leading to Ph D. Degree (March)

PUBLICATIONS FROM THE LABORATORY

Dr. S. PARAMASIVAN

1. "Indian Wall Paintings" - Journal of the Madras University, 1940.
2. "Technique of the Painting Process in the Bagh Caves in Gwalior State"
- Nature, Vol. 144, page 554, Sep. 23, 1939.
3. "The Wall Paintings in the Bagh Caves - An Investigation into Their
Methods". - The Proceedings of the Indian Academy of Sciences Vol.
X, No. 2, Sec. A, 1939.
4. "Technique of the Painting Process in the Rock-cut Temples at Badami".
The Proceedings of the Indian Academy of Sciences Vol. X, No. 3,
Sec. A, 1939 .
5. "Technique of the Painting Process in the Cave Temple at Sittannavasal".
Nature, Vol. 139, PP 1, Jan. 16, 1937
6. "The Mural Paintings in the Cave Temple at Sittannavasal - An
Investigation into the Method". Technical Studies, Vol. VIII, No. 2 Oct
1939.
7. "The Pallava Paintings at Conjeevaram An Investigation into the
Methods". The Proceedings of the Indian Academy of Sciences,
Vol X, No. 2, Sec. A, 1939
8. "Technique of the Painting Process in the Brihadesvara Temple at
Tanjore", Nature, Vol. 137, Page 867 May 23, 1936.
9. "The Mural Paintings in the Brihadesvara Temple at Tanjore. An
Investigation into the Method". Technical Studies Vol. V, No. 4, April,
1937.
10. "Technique of the Mural Paintings in the Brihadesvara Temple at Tanjore".
Current Science, Vol. VI, No. 6, 1937
11. "Technique of the Painting Process in the Cave Temples at Ellora". Annual
Report of the Hyderabad Archaeological Department.

12. "Technique of the Painting Process in the Temple of Vijayalaya Cholisvaram in Pudukkottai State", Vol. 140, Page 198, July 31, 1937.
13. "Technique of the Painting Process in the Temple of Vijayalaya Cholisvaram in Pudukkottai State". The Proceedings of the Indian Academy of Sciences, Vol. VIII, No. 4, Sec. A, 1938.
14. "Studies in Indian Paintings". Journal of the Madras University, Vol. XIII, No. 1.1
15. "Electrolytic Restoration of Bronze Statues and Inscribed Copper Plates". The Proceedings of the Indian Academy of Sciences, Vol. XIII, No. 1, Sec. A, 1941.
16. "Investigations on Ancient Indian Metallurgy". The Proceedings of the Indian Academy of Sciences, Vol. XIII, No. 2, Sec. A, 1941.
17. "The Diamagnetism of Graphite", Indian Journal of Physics, 1929.
18. "Specific - heat in Relation to Raman Effect Data". Indian Journal of Physics, 1931.

R. SUBRAMANIAN

1. "Analysis of Ancient Glass Beads". Current Science, Vol. 19, 1950, pp. 19 -20
2. "Scientific Methods in Art and Archaeology" - Transactions of the Archaeological Society of South India, Madras, 1957-58. page 79-86.
3. "Chemical Methods of Restoration and Preservation of Museum Exhibits" Handbook of Museum Technique. Govt. Museum, Madras, 1960.

N. HARINARAYANA

1. "Chemical Conservation Laboratory of the Government Museum, Madras". Madras Information, April, 1, 1965.
2. "A Method of Recording Chemical Conservation Work", Studies in Museology, 1965

3. "Cleaning of Paintings in the Sriranganathaswamy Temple at Srirangam". *Damilica*, Vol. II.
4. "Preserving the Past". *Science Today*, July, 1973.
5. "Conservation of Ethnological Material". *Conservation of Cultural Property in India*, Vol. VI 1973, P P. 82-85.
6. "Conservation of Art Objects and Antiquities", *Proceedings of the CCSIP Seminar*, March, 1974.
7. "Copper in Antiquity". *Science Reporter*, Sept. 1977.
8. "A Laboratory for Small Museums". *Journal of Indian Museums*, Vol. XXXIII, 1976-77.
9. "Some Problems Pertaining to Conservation of Cultural Property". *Conservation of Cultural Property in India*, Vol. IX 1976.
10. "Some Observations of the Treatment of a Hoard of Lead Coins from Andipatti". *Archaeological Studies*, Vol. II, 1977.
11. "Isotope-excited X-ray Fluorescence Analysis". *Studies in Museology*, Vol. XIII-XIV, 1977, P. 24-31.
12. "Conservation of British Prints". *Archaeological Studies*. Vol. III, 1978, pp. 42-46.
13. "Problems in Scientific Examination of Metal Objects". *Conservation of Cultural Property in India*, Vol. XI, 1978, pp. 36-40.
14. *Chemical Conservation & Research Laboratory of the Government Museum, Madras, Golden Jubilee, 1930-1983*, Dec. 1982.
15. *Radiation Hazards Associated with Utilisation of Nuclear Energy for War-like and Peaceful Purposes*, *Science and Culture*, 1958.
16. *Light Alloys in Engineering*, *Science and Culture*, 1957.
17. *Museums of Andhrapradesh*, *Studies in Museology*, 1969.
18. *Documentation in Conservation Laboratory of Museums*. *Documentation in Museums*, *Proceedings of the All India Museums Conference*, 1973.

19. Conservation of Wood-carving in the Government Museum, Madras. Conservation of Cultural Property in India, Vol. II, 1974.
20. The Treasure-trove Act and the Government Museum, Madras, Museums and Museology, New Horizons, 1980.
21. The Scope of Chemical Conservation. Bulletin of the Institute of Traditional Cultures, 1980.
22. Storage in Museums. A Survey of Problems and Solutions, Journal of Indian Museums, 1981.
23. Thermoluminescence. The New Aid to Dating of Ancient Materials. Cultural Centre of India, Part II, 1981.
24. Electrolytic Restoration of Bronzes: An Assessment of the Method Employed in the Chemical Conservation Laboratory of the Government Museum, Madras. Conservation of Cultural Property in India, 1981-82.
25. Setting up a District Museum : An Experience as Model, Journal of Indian Museums, 1982.
26. Electrolytic Restoration, Srinidhi, Perspectives in Indian Archaeology, Art and Culture, 1983.
27. The Need for a Component of Art History in Conservation Training, Conservation of Cultural Property in India, 1983 & 1984.
28. The Design of An Exhibit with Synchronised Commentary, Journal of Indian Museums, 1984.
29. Fundamentals of Museology, Journal of Indian Museums, 1984.
30. Observation on Corrosion of Bronzes Acquired from Treasure-troves and Their Condition After Treatment in the Government Museum, Madras. Proceedings of the Asian Regional Seminar, 87.
31. The Importance of Chemists in Archaeology. Proceedings of the First International Colloquium on Role of Chemistry in Archaeology, 1991.
32. Indian wall Paintings
33. Preserving the Paintings, Yuva Bharati

34. Work of Museums of Arts and Crafts for the Rural Community in India.
35. Restoration - A Critical View.
36. The Approach to Authentication
37. Development of Chemical Conservation in Tamilnadu, Tamil Civilization.
38. The Cola Paintings : A Technical View, Tamil Civilization, Vol. 3.
39. Paintings in Tamilnadu (From the Nayaks to the 19th Century) Historical Survey 11. Tamil Civilization
40. Electrolytic Treatment of Metals. National Research Laboratory for Conservation of Cultural Property, Lucknow.

B. RAMACHANDRAN

1. "Study of Weights and Standards of Silver Punch-marked Coins of Mambalam & Bodinayakanur Hoards". Transactions of the Archaeological Society of South India, Madras, 1957-58, pp. 118-130.

S. THANGAVELU

1. "The Conservation Laboratory of the Tamil Nadu Govt. Museum, Madras". Studies in Conservation, Vol. 17, No. 4, Nov. 72.
2. Art of Metal Casting. The Hindu, 2.6.1996.
3. The National Art Gallery, The Hindu.
4. Dr. U.V. Swaminatha Aiyar, The Hindu.
5. Restoration of Tanjore Paintings, The Hindu.
6. Ananda Coomaraswamy, The Hindu.
7. Fossils, The Hindu

Dr. V. JEYARAJ

1. Preservation of Art Objects. Oil Paintings, Tamilarasu, Malar 12, Ithazh 15, 1982.
2. Preservation of Wooden Objects, Ilam Vignani, Malar 18, Ithazh 6, December, 1982.

3. Preservation of Bronzes, Tamilarasu, Malar 15, Ithazh 23, 01.6.1985.
4. Science Behind the Conservation of Museum Objects, Seminar on Tamil in Science, 1987.
5. Preservation of Art Objects : Coins, Kalaikadhir, Malar and Ithazh 10, 1987.
6. Teerful Story of Palmleaf Manuscripts, Dhinamalar, Erode, 22.4.1987.
7. Preservation of Palmleaf Manuscripts, Periyar District Historical 7 Archival News Letter, July 1989.
8. The Damages to Bronzes and Their Preservation, Tamilarasu, Malar 24, Ithazh 23, Madras, 1.6.94.
9. Preservation of Our Cultural Heritage, Tamilarasu, Malar 25, Ithazh 5-10, 1.9.94 & 16.9.94.
10. Non-destructive Analysis of South Indian Fanam, Journal of the Numismatic Society of India, Vol. XL 111, Part 2, 1981.
11. A Technical Study of Selected Kalamkari Textiles of Government Museum, Madras, Conservation of Cultural Property in India, Vol. XIV and XV, 1981-82.
12. Electrolytic Brushing, Abstracts Book, VII Annual Symposium in Chemistry, 5-6, March 1983.
13. Electrolytic Sampling for Analysis of Metallic Antiquities, Abstracts Book, VII Annual Symposium in Chemistry, 5-6, March 1983.
14. Ethnological Collections, Conservation Problems and Their Solutions in Government Museum, Madras, Journal of Indian Museums, Vol. XXXIX, 1989.
15. Chemical Analysis and Conservation of Selected Iron Objects, Abstracts Book, IX Annual Symposium in Chemistry, 3-4 March.
16. Conservation of Iron Objects, Journal of Asian Studies, Vol No. 1, Sept. 1984.

17. Some Technical Aspects of the Conservation of British Oil Paintings on Canvas, Conservation in Cultural Property in India, Vol. XVI, & XVII, 1983 & 1984.
18. Analysis and Preservation of a Stone-Image, Abstracts Book, Xlth Annual Symposium in Chemistry, 9-10, March, 1985, Indian Institute of Technology, Madras-36
19. Physico-Chemical Study of Ancient Lead Coins, Eleventh Annual Symposium in Chemistry, March 15-16, 1986, Indian Institute of Technology, Madras-36.
20. Use of Sodium Chlorite - Formaldehyde Mixture in Conservation: Some Case Studies, Conservation of Cultural Property, Vol. XI 1985-1987.
21. Care of Water Colour Painting on Leather, Conservation of Cultural Property in India, Vol. No. XVIII-XX, 1985-1987.
22. Analysis of Some Indian Bronzes, Conservation of Cultural Property in India, Vol. XXI, 1988.
23. Common Defects and Corrosion Types in Metallic Antiquities By Metallography, Conservation of Cultural Property in India, Vol. XXII, 1989.
24. Some Observation of Fungal Attack on Museum and Allied Objects. Biodeterioration of Cultural Property, Lucknow, India 1989.
25. Temple Car Preservation in Tamil Nadu, Indian Association for the Study of Conservation of Cultural Property, News Letter No. 20, January, 1991.
26. Physico-Chemical Examination of Two Punch-marked Coins, Studies in South Indian Coins, Volume 2, 1992.
27. Study of Andipatti Lead Coins and Their Preservation, History of Science and Technology in India (Book), Vol. VIII, Ed. G. Kuppuram Etal.
28. A Study of the Corrosion and the Technology of Lead Coins from Andipatti, Tamil Nadu, Conservation of Cultural Property in India, 1992.
29. A Technical Study of Five Copper Coins from Tamil Nadu, Studies in South Indian Coins, Ed. Dr. A.V. Narasimhamurti, 1998.

30. Conservation of Coins, Coinex 94 Madras, Special Bulletin, Madras Coin Society, 1994.
31. General Conservation Problems and Their Control Measures in Government Museum Madras (India), Conservation, Preservation and Restoration Traditions, Trends and Techniques, Birla Archaeological and Cultural Institute, Hyderabad, India, 1994.
32. The Susceptibility to Deterioration and the Strategy for the Preservation of Amaravathi Limestone Sculptures at Government Museum, Madras, Conservation of Cultural Property in India, Vol. 27, 1994.
33. Sir. T. Muthusamy Iyer's Portrait Painting by Raja Ravi Varma Restored, Tamilarasu, Malar 26, Ithazh 5, 1.9.95, Madras.
34. Chemistry Behind the Preservation of Paper Materials, Conservation of Books and Paper Manuscripts (Book), Ed. S. Sumathra, The C. P. Ramasami Iyer Foundation, Madras, 1996.
35. A Study on the Wall Paintings at Chitra Sabha, Courtalum, Conservation of Cultural Property in India, Vol. 28, 1995.
36. Non-destructive Testing of Antiquities in Government Museum, Madras, 14th World Conference on Non-destructive Testing, New Delhi, India, Dec. 8-13, 1996.
37. Care of Temple Antiquities, Udumalaipettai Arulmigu Prasanna Vinayagar Thirukoil Thirukuda Nanneerathu Peruvizha Malar, 26.1.1996.

THE COURSE ON "CARE OF MUSEUM OBJECTS" CHEMICAL CONSERVATION SECTION,

Government Museum, Chennai- 600 008.

PROSPECTUS

Aim of the Course

The Chemical Conservation and Research Laboratory of the Museum was established in 1930 to preserve the bronze icons in the museum. Later it enlarged its scope to other antiquities. It has conserved thousands of antiquities and art objects in Tamil Nadu, Pondichery and Andhra Pradesh. With the limited staff, the museum could not cater to the conservation training needs as there were many requests for training the personnel from other institutions. In order to disseminate knowledge about the basic measures to be taken for the preservation of objects of art and other antiquities, the refresher course on "Care of Museum Objects" was started in 1974.

Duration of the Course

The duration of the course is one month, during June. The candidates selected should attend on all the days of the course.

Venue of the Course

Both lectures and practical classes will be conducted in the Chemical Conservation and Research Laboratory of the Museum.

Eligibility for the Course

The refresher course is open to persons working in departments like Museums, Handicrafts, Archaeology, Temple Endowments, Education and students of Museology, Fine Arts, Crafts and Art. Others with special interest in the subject of the course also will be considered, if possible.

Since conservation training needs close attention by trained staff and in order to have better training admission is restricted to only ten persons.

Application

Application form duly filled in should be sent to the Commissioner of Museums, Government Museum, Chennai - 600 008. so as to reach him on or before 15th April. Applications received after 15th April, will not be considered. Candidates sponsored by Departments or Institutions will be given preference. Other candidates should get introduction from reputed academicians for the credibility of the candidates.

Course fee etc

Selected candidates are required to pay Rs. 200/- as Course Fee in the Museum office. The participants will have to bear the expenses for some chemicals and other materials required. This may be approximately Rs.100/- only. All expenditure towards their travel, stay for the purpose of attending the course and field trips would have to be borne by the participants.

Certificate

The participants will have to submit a dissertation of about 10 pages at the end of the course besides a written test. A certificate of having undergone the course satisfactorily will be awarded to the participants at the end of the course

Field Trips

The participants will be taken to Mahabalipuram, Kanchipuram, Central Leather Research Institute, Tamil Nadu Archives, Theosophical Society, chemical branch of the Archaeological Survey of India at their cost in order to observe the various conservation and preservation works carried out in the respective areas.

Syllabus

The following topics will be covered in the course

1. History of conservation and conservation laboratories
2. Classification of museum objects
3. General methods of preservation

4. Atmospheric factors affecting museum objects
5. Biodeterioration
6. Care of organic objects (wood, textiles, paper, leather including tribal objects)
7. Care of inorganic objects (stone, terracotta, glass etc.)
8. Care of metals (bronzes, jewellerys, coins, weapons etc.)
9. Care of paintings (canvas, paper, panel, glass etc.)
10. Care of wall paintings
11. Care of monuments
12. Care in display and storage
13. Documentation in conservation
14. Care in transportation of museum objects
15. Care of photographic materials
16. Data processing in conservation
17. Preventive conservation and non-toxic pest control methods
18. Care in arranging exhibition

Experts in the subjects will handle the theory and practical classes.

An exhibition on "Care of Museum Objects" will be set up on the last day of the course by the participants with the objects conserved by them.

APPLICATION FOR THE REFRESHER COURSE ON

"CARE OF MUSEUM OBJECTS"

**CHEMICAL CONSERVATION SECTION, GOVERNMENT MUSEUM,
CHENNAI - 600 008.**

Name of the Candidate :

Designation :

Institution to which he/she belongs :

Residential address :

Educational Qualifications :

Experience :

Publications, if any :

Date of birth & Age :

Languages known to read and write :

DECLARATION

I shall abide by the rules and regulations of the course which will be in force during the refresher course.

Date:

Signature of the candidate

Remarks of the head of the institution/reputed academician:

